

Combining GLM and ABI Data for Enhanced GOES-R Rainfall Estimates

A New GOES-R3 Project (combining with Nai-Yu Wang's R3 Project)

PI's/Co-I's: R. Adler, N. Wang, W. Xu (U. of Maryland/CICS)

Collaborators: Kuligowski, Bruning, Albrecht, Grecu, Chesters, Nesbitt, Ferraro

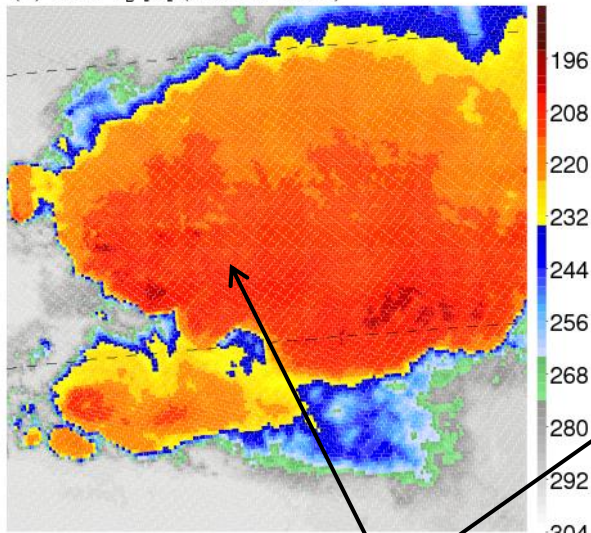
- Examine lightning-convective core relations with TRMM data (LIS, PR, TMI, and VIRS)
- Develop relations and methods to use lightning information to enhance convective vs. stratiform delineation for improved microwave precipitation estimation (from N. Wang project)
- Develop an initial scheme to use lightning information from GLM to identify convective cores and develop lightning flash rate/area relations to volume rainfall; link to GOES-R Baseline algorithm

End Result: An improved Geo-IR rain estimation scheme using GLM data to:

- 1) better identify convective cores when masked by anvil debris
- 2) eliminate false IR convective features in mature systems
- 3) provide information on convective core size and volume rainfall rate

1. Limitations of IR Rain Estimates

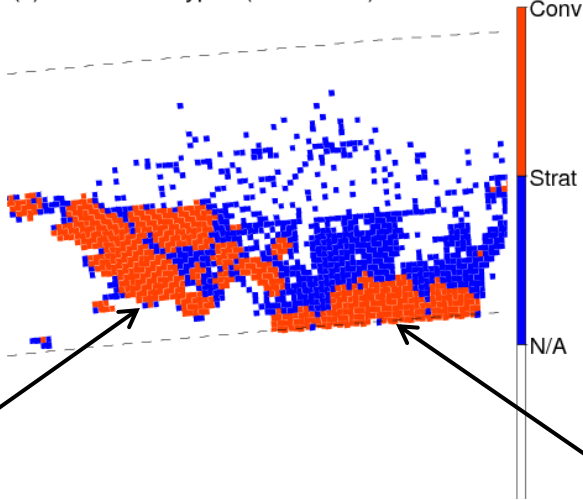
(a) CH4 T_B [K] (TRMM VIRS)



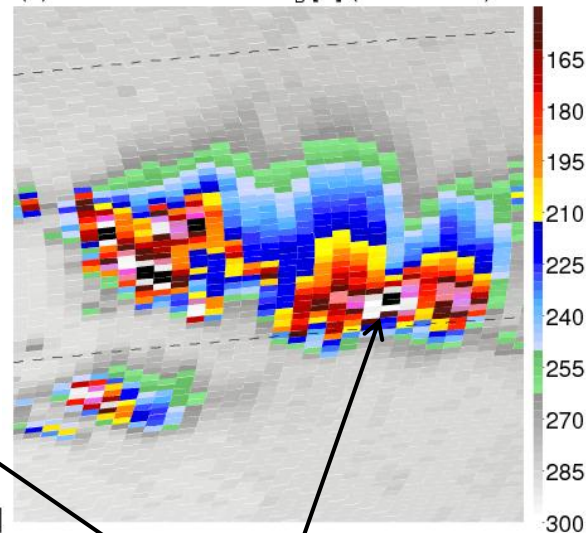
Convective regions are hard to define in IR

Lightning can improve definition of convective cores, and aid IR rain estimation.

(c) 2A23 Rain Types (TRMM PR)

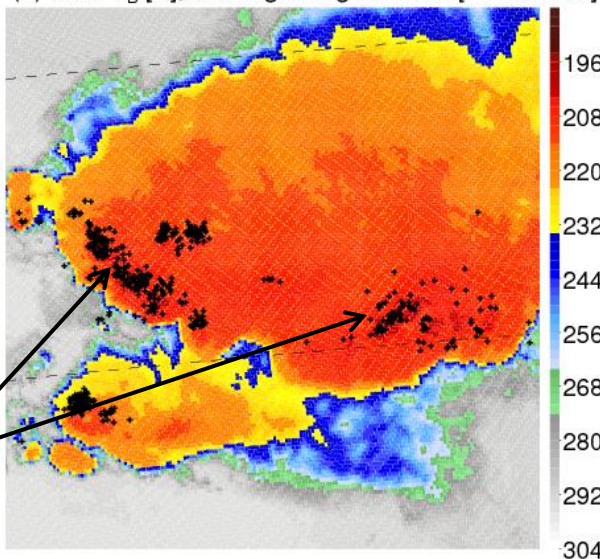


(b) V-Polarized 85GHz T_B [K] (TRMM TMI)

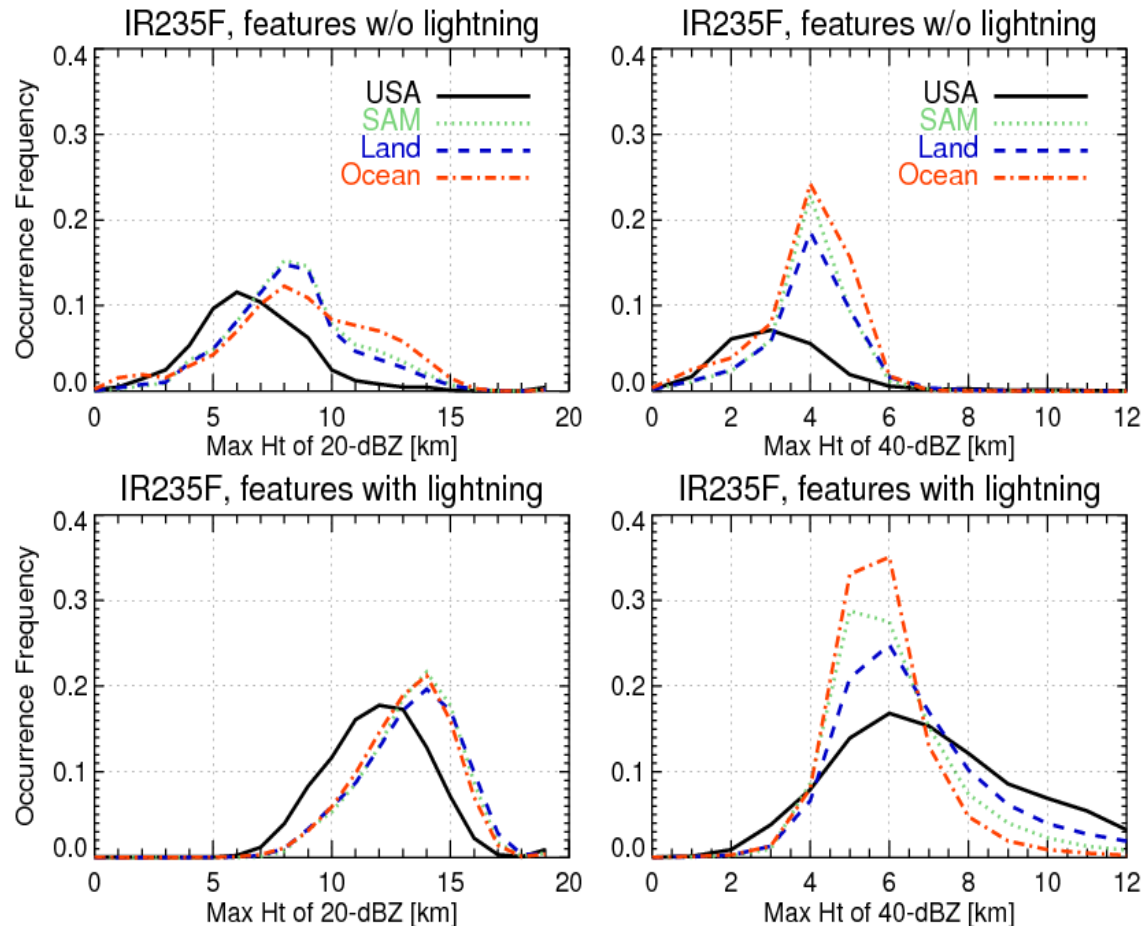


Low values of MW T_b and Radar convective typing catch the convective regions quite well.

(d) CH4 T_B [K], and Lightning Flashes [Black Dots]



2. Storm Discrimination



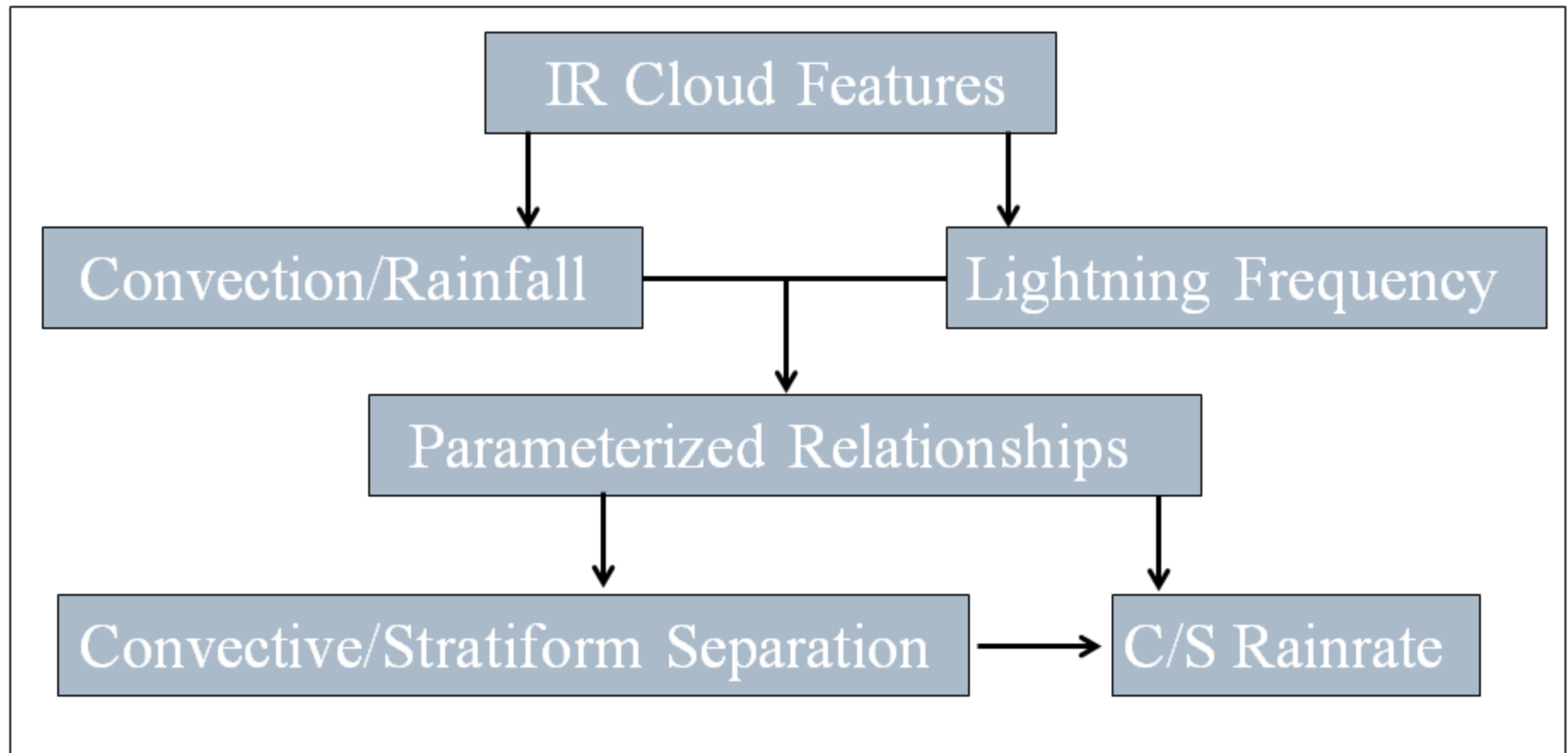
IR235F:

Cloud features defined by $IR\ Tb < 235K$;

Radar, microwave, and lightning measurements are collocated in each cloud feature.

Lightning info. obviously very helpful in discriminating IR cloud features of different convective properties (as indicated by radar data).

3. Approach for IR/Lightning Rain Estimation



Upcoming Work:

- Initial new work focusing on using TRMM Precipitation Feature (PF) data base to develop relations
- TRMM overpasses will be compared to NESDIS Geo-IR rain estimates to make first link to Baseline rainfall algorithm